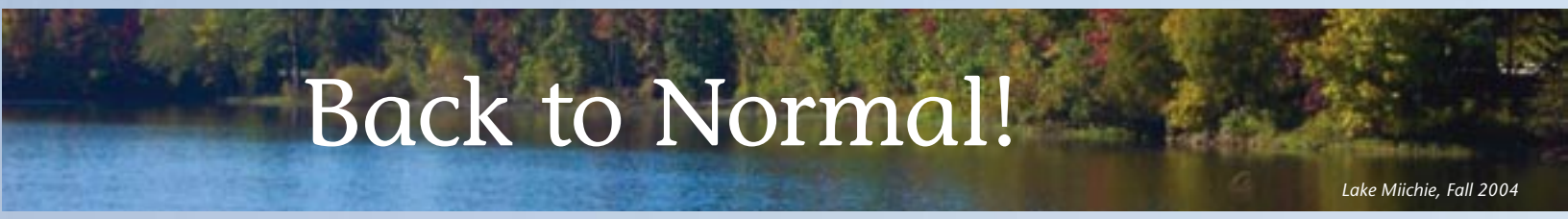
WATER QUALITY REPORT 2004

TAP INTO Quality

DURHAM
1869
CITY OF MEDICINE

Department of Water Management

Back to Normal!


Lake Miichie, Fall 2004

For the first time in three years, Durham did not face the challenges of limited water supply (such as the drought of the century in 2002) or catastrophic winter weather. Although our neighbors to the south, notably Florida, experienced multiple hurricane hits, most of North Carolina and the Piedmont were treated to a normal year! To water providers, "normal" means that supply lakes are full on April 1st of each year and that sufficient rainfall is received throughout the year so that lakes remain at least 80 percent full. For the calendar year 2004, the Durham area received 47.05 inches of rainfall, which is four inches more than the 30-year annual average rainfall for the area of 43.05 inches. Also, temperatures were relatively normal, with few days in excess of 90 degrees. Both Lake Michie and Little River remained relatively full throughout the summer months, dropping by a maximum of 3.1 feet and 5.3 feet respectively. For comparison purposes, Lake Michie levels dropped almost 24 feet during the height of the drought in mid-August 2002.

With normal conditions in place, Durham's treatment plants delivered an average of 26.82 million gallons of water per day (mgd) to over 192,000 people in Durham City and County. This 3.8 percent increase in demand over the previous year is a normal, expected and planned for gain due to growth in the area. The Department of Water Management, Water Supply and Treatment Division employees take pride in continuing to deliver an adequate supply of clean, safe water to your tap. This requires dedicated teamwork from all 283 individuals, work-groups and divisions within the Department of Water Management as well as cooperation and collaboration with several City and County departments.

We are pleased to present the 2004 edition of ***Tap into Quality***, the City's annual water quality report and share that the water from your tap continues to comply with all state and federal requirements for drinking water. This report is prepared and distributed each year in accordance with state and EPA mandates. In this report, you will find a table showing that Durham's tap water had ***zero violations of water quality standards*** during the 2004 calendar year. The substances detected were all well below the levels allowed by the Environmental Protection Agency (EPA). The City is required to test for more than 100 different constituents in the drinking water and the compounds listed in the tables represent just a fraction of the total number of required and voluntary analyses conducted each year.

During the 2004 calendar year, Durham did receive a reporting violation for Inorganic Metals (Cyanide) from the state. As staff researched the issue, it was determined that the correct sample was collected, analyzed (by appropriate method) and submitted to the state within the appropriate timeframe. However, the information was reported on a form that was not marked "for compliance purposes," and therefore generated a notice of violation from the state. In February of 2005, we also received a reporting violation for Total Organic Carbon (TOC). Although the appropriate samples were collected, analyzed and submitted to the state, the results were held up in the US Postal System and were not received by the state's due date. City staff has undertaken a number of measures, including the pursuit of electronic submittal of results, to prevent any future reoccurrence of these issues. Please note that the health and safety of Durham's drinking water was never compromised and water quality standards were consistently met.

Outreach & Education EFFORTS

Water Management staff are always happy to participate in activities that foster knowledge about water resources, water quality and water/wastewater treatment. Specifically, Conservation Program staff members engage in a number of outreach activities that promote wise water use. Old, water-wasting showerheads can be exchanged for water efficient ones at community events throughout the year. These events include CenterFest, Durham Earth Day Festival and the Waste Less Fests held several times and at various locations during the year. The department also sponsors the annual poster contest for Durham school children. After learning about the importance of having adequate, safe water to drink, children design and submit themed posters for judging. This year, several local school children, including former poster contest winners, rode on the department's float in the 2004 Durham Holiday parade.

Community PARTICIPATION

How can you be involved in decisions regarding Durham's water system or other City issues? Citizens are welcome to attend regularly scheduled meetings of Durham's City Council. Council meetings are the first and third Monday of each month at 7 p.m. City Council members also have regular work sessions to prepare for Council meetings. These sessions occur on Thursdays – two weeks prior to each regular Council meeting. Work sessions are held at 1 p.m. in the Council's Committee Room on the second floor of City Hall. Council meetings are held at City Hall in the Council Chambers on the first floor. Check the City's website to confirm meetings at **www.durhamnc.gov**. City Hall is located in downtown Durham at 101 City Hall Plaza.

SPECIAL CONCERNS

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their healthcare providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial organisms are available from the **Safe Drinking Water Hotline (800-426-4791)**.

WHAT IS *CRYPTOSPORIDIUM*?

This microscopic organism, while a concern for water providers, is typically very effectively removed by the water treatment process combination of filtration, sedimentation and disinfection. However, when ingested, *Cryptosporidium (Crypto)* can cause fever, diarrhea, and other gastrointestinal symptoms. *Crypto* occurs naturally in rivers and lakes and comes from animal wastes. Controlling and minimizing development and animal activities in our watershed reduces the occurrence of *Crypto* in raw water. As part of the Information Collection Rule, Durham has monitored both supply lakes on a monthly basis since July of 1997. *Crypto* has **never** been detected in Durham's treated drinking water.

CONSERVATION TIP #95

Choose new water saving appliances, like a front-loading washing machine that **saves up to 20 gallons per load**.

Old Quarry Finds New Role IN DURHAM'S WATER SUPPLY FUTURE

Teer Quarry

Nestled in northern Durham near the Eno River, Hanson Aggregate's Durham Quarry served as a source of rock materials for over 40 years, although it has not been mined in over a decade. The City of Durham originally investigated the quarry as a potential public water supply in the early 1970's. This preliminary planning was part of Durham's development of the Little River Reservoir.

During the historic drought of 2001 and 2002, the quarry was again looked at as an emergency water source when Lake Michie and Little River reservoir levels were extremely low. Even after the rains began in October 2002 and the reservoirs re-filled, the City of Durham realized that the quarry is vital to Durham's future water supply. In 2003, the City contracted with engineering firm Hazen & Sawyer to conduct the "Feasibility Study for Teer Quarry Off-Line Raw Water Storage Reservoir." This study provided basic information about the quarry's potential to provide a temporary storage location for water withdrawn from Eno River, Lake Michie and Little River Reservoirs. Based upon that initial study, the quarry has the potential to add 1.32 billion gallons of storage capacity to the City's current supply.

In 2004, the City contracted with Camp, Dresser, and McKee to provide the preliminary engineering services related to implementing the recommendations outlined in the feasibility study. During the engineering project phase, the geological and regulatory research will be conducted to ensure that the quarry will meet State regulations as well as the City's requirements. The City anticipates that this phase of the project will be completed by fall of 2005.

ABOUT THE City of Durham's Department of Water Management

The Department of Water Management is responsible for all operational functions of the water and sewer systems. This includes the operation and maintenance of Durham's water supply, water treatment and water reclamation facilities as well as supporting functions such as customer billing, meter reading, system rehabilitation, water and sewer maintenance and facility maintenance. Water Management is also responsible for the long-range planning for improvements in the City's water supply, water treatment and wastewater treatment facilities. Additional departmental responsibilities include oversight and implementation of the Water Conservation Program, the Household Hazardous Waste Program, and several monitoring programs such as the Industrial Waste Pretreatment Program and Cross-Connection Control Program. Public information and education programs are also provided, including coordination of tours of reservoirs, water treatment and water reclamation facilities, and participation in community events.

New Initiatives FOR THE REORGANIZED DEPARTMENT

The Department of Water Management will complete its first full year as a newly organized "utility" department on June 30, 2005. The City of Durham is currently in the process of implementing an Automated Meter Reading (AMR) program to reduce the cost of reading and collecting other information from water meters throughout the entire water system. In addition to the financial benefit from implementing AMR technology, AMR will enhance the system management efficiency and improve customer service.

An AMR system starts with installing a water meter which contains a small transmitter. The water meter is able to store the water consumption information and transmit via a radio signal. Meter readers can then either collect information from a receiver mounted in a vehicle that drives along the street or from a radio antennae mounted to a telephone pole or building. The readings collected in the receiver are then downloaded into the utility billing system for processing.

While the City is currently using AMR technology to read meters for 100+ large customers, we plan to implement an AMR system for the residential and smaller commercial water meters over the next several years. These water meters represent over 96 percent of the more than 75,000 water meters in the system. Over the last nine months, City staff have been researching and evaluating the different AMR technologies to find the best fit for City purposes. Duke Power and CP&L have already implemented AMR systems in the area.

Questions?

Questions regarding the information in this report should be directed to Water Management staff at the Brown Water Treatment Plant at **560-4362**. For information on water conservation or to arrange a tour of facilities, call **560-4381**. Call **560-4411** for **all** billing questions. For additional information about City operations and services, contact **Durham One Call at 560-1200** or visit the City website at www.durhamnc.gov.

DURHAM One Call DOES IT ALL 560-1200

En Español

Este folleto tiene información importante acerca de la calidad del agua que provee la Ciudad de Durham. Si necesita mayor información acerca del contenido de este folleto el personal del Centro Hispano, 201 W. Main St. Suite 100, teléfono **687-4635**, puede ayudario.

CONSERVATION TIP #31

Direct downspouts and other runoff toward shrubs and trees or into a rain barrel.

2004 Poster Contest RESULTS

Miriam Orinda & Xiao Song, first place winners for Grades 6-8 and their winning poster entry.

The theme for the 2004 contest was **"Water – Use It Wisely."** Congratulations to our winners:

K-2 Winning Entries:
1st Place: Erika Jara, *Kindergarten, EK Powe Elementary*
2nd Place: Jorge Campos, *Kindergarten, EK Powe Elementary*
3rd Place: Cesar Vargas, *1st Grade, EK Powe Elementary*

Grades 3-5 Winning Entries:
1st Place: Christina Hannah, *5th Grade, CC Spaulding Elementary*
2nd Place: Grace Diver, *3rd Grade, Trinity School*
3rd Place: José Banuelos, *5th Grade, EK Powe Elementary*

Grades 6-8 Winning Entries:
1st Place: Miriam Orinda & Xiao Song, *7th Grade, Githens Middle School*
2nd Place: Dylan Britt, *7th Grade, Brogden Middle School*
3rd Place (tie): Megan Ashworth, *7th Grade, Brogden Middle School*
3rd Place (tie): Julia McEwen, *7th Grade, Brogden Middle School*

Local Statewide Winning Entries: Three local winners also placed in the statewide Water Conservation poster contest. They were: Miriam Orinda & Xiao Song, 1st Place, *Grades 6-8*
and Megan Ashworth, 2nd Place, *Grades 6-8*

DURHAM'S **Water Sources**

The sources of drinking water – both tap and bottled – include rivers, lakes, streams, ponds, reservoirs, springs and wells. Durham is fortunate to have two high quality sources of raw (untreated) water. Lake Michie, built in 1926, reliably supplied approximately 19 million gallons per day (MGD) for over 60 years. Driven by rapid development in the mid 1980s, the City constructed the Little River Reservoir and Dam in 1988 to provide an additional 18 MGD of water, for a combined capacity of 37 MGD. In addition to having two water supplies, Durham also has two water treatment plants, the Williams Water Treatment Plant (located on Hillandale Road) and the Brown Water Treatment Plant (located on Infinity Road). Water can be transferred from the two supply lakes to the two treatment plants by gravity flow, hydropower or electric power. Terminal reservoirs at each of the water treatment plants hold a two to three day supply of raw water. In 2002, the City of Durham obtained an allocation of 10 million gallons of water per day from Jordan Lake, another local high quality water source. Future plans call for building a raw water intake at Jordan Lake; however current access is via the Town of Cary's water system. The city also plans to use Hanson Aggregate's Durham Quarry (formerly Teer Quarry) for additional water storage. Read more about this project later in the report.

Spillway at Little River Dam

HOW DOES **Water Travel?**

As water travels over the surface of the land or through the ground, minerals and other materials are dissolved naturally. Water can also pick up substances that are the result of animal or human activity. Source water may contain microbial contaminants such as viruses and bacteria; inorganic contaminants such as salts and metals; pesticides and herbicides from agriculture or urban run-off; organic chemicals from industrial processes or run-off; and radioactive contaminants which can be naturally occurring.

New Source Water INFORMATION AVAILABLE

The North Carolina Department of Environment and Natural Resources (DENR), Public Water Supply (PWS) Section, Source Water Assessment Program (SWAP) conducted assessments for all drinking water sources across North Carolina. The purpose of the assessments was to determine the susceptibility of each drinking water source (well or surface water intake) to Potential Contaminant Sources (PCSs). The results of the assessment are available in SWAP Assessment Reports that include maps, background information and a relative susceptibility rating of Higher, Moderate or Lower. Since these reports are over 100 pages each, DENR requires only that water providers present the basic information from the report in each year's water quality report.

The relative susceptibility rating of each source for the City of Durham was determined by combining the contaminant rating (determined by the number and location of PCSs within the assessment area) and the inherent vulnerability rating (i.e., characteristics or existing conditions of the watershed and its delineated assessment area). The assessment findings are summarized in the table below:

Susceptibility of Sources to Potential Contaminant Sources (PCSs)

SOURCE NAME	SUSCEPTIBILITY RATING	SWAP REPORT DATE
Little River Reservoir	Moderate	March 18, 2005
Lake Michie	Moderate	March 18, 2005

The complete SWAP Assessment report for the City of Durham (PWSID# 03-32-010) may be viewed on the Web at: **www.deh.enr.state.nc.us/pws/swap**. Or you may obtain a printed copy of this report by mailing a written request to: Source Water Assessment Program – Report Request, 1634 Mail Service Center, Raleigh NC 27699-1634, or emailing a request to swap@ncmail.net. Please indicate the system name (City of Durham), PWSID (03-32-010), and provide your name, mailing address and phone number. If you have any questions about the SWAP report please contact the Source Water Assessment staff by phone at 919-715-2633.

It is important to understand that a susceptibility rating of "higher" **does not** imply poor water quality, only the systems' potential to become contaminated by PCS's in the assessment area. The City's "moderate" rating indicates a lesser potential for contamination.

HOW IS **Durham's Water Treated?**

Both the Williams Water Treatment Plant (built in 1927, current capacity of 22 MGD) and the Brown Water Treatment Plant (built in 1977, current capacity of 30 MGD) operate using optimized conventional water treatment processes. At the water treatment facilities, raw water is mixed with lime to adjust the pH and alum and/or ferric chloride to coagulate particles. After mixing, the water flows into settling basins where the particles clump together (coagulation) and become heavy and settle to the bottom of the basins (flocculation). After disinfection, the clearer water flows through filters, removing the remaining particles. Fluoride is then added prior to distribution to our customers.

Plant Operator Tim Lockamy conducts routine facility checks.

WHAT CAN YOU **Expect of Drinking Water?**

In order to ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration establishes regulations for contaminants in bottled water that must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

WATER USE IT WISELY

CONSERVATION TIP #28

Put food coloring in your toilet tank. If it seeps into the toilet bowl, you have a leak. It's easy to fix and you can **save more than 600 gallons a month**.

CONSERVATION TIP #23

Time your shower to keep it under five minutes. You'll **save up to 1,000 gallons each month**.

SUBSTANCE AND UNIT OF MEASUREMENT	MAX. LEVEL DETECTED AND RANGE	MAX. LEVEL ALLOWED (MCL)	IDEAL GOAL (MCGL)	POTENTIAL SOURCE(S) OF SUBSTANCE	REASON(S) FOR REGULATING SUBSTANCE
Regulated at the Treatment Plants					
Barium mg/L	0.029 (<0.025 – 0.029)	2.0	2.0	Discharge of drilling wastes, discharge from metal refineries; erosion of natural deposits	Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
Fluoride mg/L	1.00 (0.90 - 1.00)	4.0	4.0	Naturally occurring mineral; also added to promote dental health	Some people who drink water containing fluoride in excess of the MCL over many years may get bone disease, including pain and tenderness of the bones. Children may get mottled teeth.
Nitrate mg/L (as Nitrogen)	0.40 (< 0.10 - 0.40)	10.0	10.0	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
Turbidity NTU	0.10 (<0.05 - 0.10)	TT	N/A	Soil runoff	Turbidity has no health effects; however, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms, such as bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
Turbidity, % of monthly samples ≤ 0.3 NTU	100%	95%	100%		
Alpha emitters pCi/L Samples were collected and analyzed October 2003.	None detected no range	15	0	Erosion of natural deposits	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water with alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
Beta/photon emitters pCi/L Samples were collected and analyzed October 2003.	None detected no range	50	0	Decay of natural and man-made deposits	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water with beta/photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
Regulated at the Customer's Tap					
Copper mg/L EPA requires sampling every three years. Sampling & analysis conducted September 2004.	< 0.05 (90th percentile)	AL=1.3	1.3	Corrosion of household plumbing systems *None of the targeted 95 sampling sites exceeded the Action Level*	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastro-intestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their health care provider.
Lead µg/L EPA requires sampling every three years. Sampling & analysis conducted September 2004.	6 (90th percentile)	AL=15	0	Corrosion of household plumbing systems *4 out of 95 targeted sampling sites exceeded the Action Level*	Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.
Regulated in the Distribution System					
Chloramines mg/L (as Cl_2)	2.8 RAA Running Annual Average	MRDL 4.0	MRDLG 4.0	Water additive to control microbes	Some people who use water containing chloramines well in excess of the MRDL may experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL may experience stomach discomfort or anemia.
Chlorine mg/l	2.4 RAA	MRDL 4.0	MRDLG 4.0	Disinfectant to control microbes; used only in March '04 during system burnout	Some people who use water containing chlorine well in excess of the MRDL may experience irritating effects to their eyes and nose.
Total Coliform Bacteria (as a percent)	0% positive	< 5% positive	0% positive	Naturally present in the environment	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful bacteria may be present.
Five Haloacetic Acids (5HAA) µg/L	42.4 - System Average (22 – 110)	60	0	By-product of drinking water disinfection	Some people who drink water containing HAAs in excess of the MCL over many years may have an increased risk of getting cancer.
Total Trihalomethanes (TTHM) µg/L	47.4 - System Average (0 – 100)	80	0	By-product of drinking water disinfection	Some people who drink water containing TTHMs in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.
Unregulated Substances					
Chlorodibromomethane µg/L	2.0 (< 1.0 – 2.0)	NR	NR	Component of TTHMs	Some people who drink water containing TTHMs in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.
Chloroform µg/L	90 (<1 – 90)	NR	NR	Component of TTHMs	
Bromodichloromethane µg/L	16.0 (<1 – 16)	NR	NR	Component of TTHMs	
Monochloro-acetic Acid µg/L	6.0 (<2.0 – 6.0)	NR	N/A	Component of 5HAAs	Some people who drink water containing HAAs in excess of the MCL over many years may have an increased risk of getting cancer.
Dichloro-acetic Acid µg/L	49.0 (11 – 49)	NR	N/A	Component of 5HAAs	
Trichloro-acetic Acid µg/L	55.0 (11 – 55)	NR	N/A	Component of 5HAAs	
Sodium mg/L	28.1 (16.4 – 28.1)	NR	20 [Proposed]	Naturally occurring element in soil and water	Sodium is an essential nutrient; however, consuming high levels of sodium can contribute to high blood pressure.
Sulfate mg/L	15 (13 – 15)	NR	250 [Proposed]	Naturally occurring mineral in soil	Sulfate may have a laxative effect for some people who drink water containing high levels of sulfate.
Total Organic Carbon (TOC) mg/l Results show the range of TOC in both source and treated water. Durham's processes remove more than the required 50%.	Average Removal 58% Source 9.1 (4.7 – 9.1) Treated 3.9 (2.0 – 3.9)	NR	TT 50% removal	Naturally present in the environment	Total organic carbon (TOC) has no health effects. However, TOC provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of cancer.

KEY TO ABBREVIATIONS IN TABLE

mg/l: milligrams per liter, or parts per million

MCL: Maximum Contaminant Level; the highest level of a contaminant that is allowed in drinking water.

MCLG: Maximum Contaminant Level Goal; the level of a contaminant in drinking water below which there is no known or expected risk to health.

MRDL: Maximum Residual Disinfectant Level; the highest level of a disinfectant allowed in drinking water.

MRDLG: Maximum Residual Disinfectant Level Goal; the level of a drinking water disinfectant below which there is no known or expected risk to health.

AL: Action Level; the concentration of a contaminant, which if exceeded, triggers treatment or other requirements that a water system must follow. Action Levels are reported at the 90th percentile for homes at greatest risk.

TT: Treatment Technique; a required process intended to reduce the level of a contaminant in drinking water

µg/l: micrograms per liter, or parts per billion

pCi/L: Picocuries per liter is a measure of the radioactivity in water.

NTU: Nephelometric Turbidity Units; measures the clarity or cloudiness of water

N/A: Not Applicable

NR: Not Regulated

ND: Not Detected

<: Less Than

Special Note: *MCLs are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.*

SUBSTANCE, UNIT OF MEASUREMENT	ANNUAL AVERAGE
pH, standard units - range	7.2 – 8.2
Alkalinity, mg/L	27
Aluminum, mg/L	0.02
Calcium, mg/L	4.9
Chloride, mg/L	23.3
Conductivity, micromhos/cm	174
Hardness - Calculated, mg/L	24
Hardness - EDTA, mg/L	24
Orthophosphate, mg/L (as phosphorus)	0.31
Potassium, mg/L	2.0
Total Solids, mg/L	102
Zinc, mg/L	0.29